I much regretted the loss of my little pet, which I had at one time looked forward to bringing up to years of maturity, and which had afforded me daily amusement and pleasure by its curious ways and the inimitably ludicrous expressions of its little countenance. Could I have obtained a regular supply of milk, or better still, could I have found some animal to have given it suck, I have little doubt it might have been reared, though it would probably never have reached the dimensions of its parents. It is probable that so young an animal of this species has never been before observed by Europeans. I have therefore given this brief account of its habits, which may not be uninteresting to lovers of nature.

Dimensions of young Orang-Utan.

	ft.	in.
Length : heel to crown	1	2
——— arms extended	1	11
——— legs extended	1	7
——— of feet	0	4
——— of hands	0	3
Girth of body	0	11
—— of thigh	0	3¾
—— of arm	0	3¾
—— of head, chin to crown	1	1¼

Weight 3 lb. 9 oz.

XXXV.—*On the Theory of the Fecundation of the Ovum.* By E. Claparède.

[Concluded from p. 311.]

We have already seen that J. Müller, on discovering an opening in the envelope of the ova of *Holothuria*, could not avoid mentioning the analogy of this canal with the micropyle of the Phanerogamous plants, so naturally did this comparison occur to the mind. Keber in his turn adopted the name of *micropyle* in treating of the ova of the *Naiades*, and we may now say that both the name and the analogy are sanctioned by science. The analogies between the modes of fecundation in the vegetable and animal kingdoms are indeed of more than one kind. What, in fact, are the phytosperms of the Cryptogamia,—for an exact knowledge of which we are particularly indebted to Nägeli and Leszczyc-Suminski,—unless they are the spermatozoa of these plants? Is it not a very remarkable fact, that in both cases fecundation should be connected with particles endowed with motion, which at first sight might be taken for animated creatures? Prévost and Dumas, Siebold, Müller, Wagner, Kölliker, Quatrefages, Bischoff, Leuckart, &c., have more especially

brought forward the importance of these mobile particles in the act of fecundation in animals. Brongniart*, Schleiden†, Nägeli‡, Griffith §, Suminski ||, and especially Hofmeister¶ and Henfrey**, have also noticed the importance of the movements of the phytosperms, or vegetable spermatozoa, and the contents of the pollen in the act of fecundation. From what we know of the generation of the Ferns, the Lycopodiaceæ, the Equisetaceæ, the Rhizocarpeæ, the Mosses, and the Characeæ, does it not present so great an analogy with the generation of animals, that the relation must strike everybody? In each case we have oogenous and spermagenous bodies, which are in such similar conditions, that we may ask why we may not say simply *ovary* instead of *archegonium*, and *testicle* instead of *antheridium*? The analogy goes so far, that we find in both groups examples of alternate generations in accordance with the same type. On one hand, for instance, we have a *Hydra* which produces, asexually, buds which become converted into *Medusæ*, whilst the *Medusa* acquires sexual organs and produces polypes in its turn, after fecundation; and, on the other hand, we have Ferns which produce buds (the so-called *spores*) asexually, which are converted into a prothallium, and this developes antheridia and archegonia, that is to say, sexual organs, and in its turn reproduces Ferns, after a fecundation. The sexuality of plants has been long in making its way into science, and, up to the most recent times, the entire group of the so-called Cryptogamia has been excluded from the privilege of possessing sexes. Is it not a singular circumstance, that it should have been reserved for our age to show that these Cryptogamia are of all plants those of which the sexual organs possess the greatest analogy with those of animals? All, or nearly all the Cryptogamia in fact appear to possess, on the one hand, archegonia (or ovaries), and, on the other, antheridia (or testicles); in the latter, spermatozoids are developed. (We prefer the term spermatozoid to that of phytosperm, because it is applicable at once to plants and animals.) We are acquainted with these organs in the Equisetaceæ, the Rhizocarpeæ, the Ferns, the Lycopodi-

* Rech. sur la Génération et le Développement de l'Embryon dans les Végétaux phanérogames. Ann. des Sci. Nat. 1828.

† Grundzüge der wissenschaftlichen Botanik.

‡ Bewegliche Spiralfaden (Samenfaden?) an Farren; in Schleiden und Nägeli's Zeitschr. für wiss. Botanik, 1844.

§ Linn. Trans. xxi.

|| Zur Entwickelung der Farrenkräuter, 1848.

¶ Untersuchungen des Vorganges bei der Befruchtung der Œnotheren. Bot. Zeitung von Mohl und Schlechtendal, 1847.

** Linn. Trans. xxi.; Ann. and Mag. Nat. Hist. ix. 1852.

aceæ, the Mosses and the Characeæ, and we have strong presumptions that we are on the way to discover them in the Florideæ, the Fucoideæ, the Lichenes and the Fungi. Lastly, their existence has lately been ascertained by Pringsheim in the freshwater Algæ*. The analogy of these organs with the generative organs of animals is so great, that it is the sole reason for their being regarded as organs of fructification; for until within the last few years we had no direct proofs of their function. And yet botanists are now almost universally agreed to regard them as organs serving for reproduction. It is an interesting fact, that at the very moment when the discovery of the penetration of the animal spermatozoid into the ovum startled the zoologists, that of the passage of the vegetable spermatozoid into the archegonium appeared on the botanical horizon. It is scarcely a year since Thuret† made known some remarkable experiments made at Cherbourg upon the spores of Fucaceæ. He found that the spores of these plants only germinate when they are in contact with the mobile elements contained in the antheridia, that is to say, with the spermatozoids (antherozoids). When the spores are isolated, which is easily done in the diœcious Fuci, they all perish without exception, and without any development. This proves at least that the antheridia have a part to play in the act of fecundation. But these experiments have not the value of direct observations, and fortunately the want of these is beginning to be supplied. Suminski has already asserted, that he has seen the spermatozoa penetrate into the archegonium of a Fern (*Pteris serrulata*). Hofmeister has observed the same phænomenon in another species (*Aspidium filix*). These observations, however, have given rise to numerous objections, reposing to a great extent upon the difficulties of observation resulting from the tissue which envelopes the archegonium. These objections can scarcely apply to Pringsheim's new discovery of the penetration of the spermatozoid into the archegonium in *Vaucheria*‡, where the sexual organs are so much exposed, that we can scarcely suppose the possibility of error. Besides the reproduction by zoospores, the *Vaucheriæ* present another means of multiplication, which depends on the development of their sexual organs; namely, on the one hand of the recurved horn-like organ, to which even Vaucher§ gave the

* Ueber die Befruchtung der Algen. Monatsberichte der Berl. Akad., March 1855.

† Comptes Rendus, xxxvi. p. 745.

‡ Ann. of Nat. Hist. 2nd Ser. xv. p. 347.

§ Histoire des Conferves d'eau douce. Genève, 1803. See especially his *Ectosperme sessile*, pl. 2. fig. 7 *a*,—sessile sceds furnished with their anther.

name of *filament serving as an anther*, and which actually performs the part of an antheridium; and, in the second place, of the slightly recurved organ placed close beside it, to which Pringsheim thinks we should give the name of *sporangium* rather than that of *spore*. In the course of its development, the sporangium, which is at first only a simple papilla, acquires a kind of beak-like process, turned in the direction of the antheridium. These two organs are then in direct communication by their bases with the tube of the *Vaucheria*, and enclose the same contents as the latter; but they soon separate from it, each forming a septum. The sporangium becomes transparent on its free side, in consequence of the accumulation in that part of the substance called the pellicular layer* (*Hautschicht*) by Pringsheim, whilst the antheridium also becomes transparent, but by the metamorphosis of its chlorophyll and the remainder of its contents. The *pellicular layer* continuing its development causes the sporangium to cleave at the place of the beak-like process, and project externally. The part which has thus issued separates in the form of a mucilaginous mass, and soon decomposes. By a very remarkable coincidence, as soon as the sporangium has split open, the point of the antheridium also opens and pours out its contents. A mass of small moveable corpuscles issues from it, which, lashing the water with their tails, move in crowds about the sporangium, pressing against the pellicular layer. As the beak of the sporangium and the parts in its neighbourhood are completely transparent and destitute of chlorophyll, it is easy to make perfectly sure of the penetration of the corpuscles (*spermatozoids*) into the interior, if this takes place. This is the case, according to the observations of Pringsheim. One or more spermatozoids penetrate into the interior of the pellicular layer, and the latter then, in common with the rest of the contents of the sporangia, becomes surrounded by a membrane which Mohl might this time consider as a true primordial utricle, but for its want of primordiality. It is the mucilaginous pellicular layer itself that becomes converted into membrane; for in proportion as the latter thickens, the former disappears. This cell, which fills all the interior of the sporangium, is therefore the true *spore*, the result of fecundation. In

* This is, in fact, the primordial utricle of Mohl, of which Pringsheim disputes the membranous nature. He has shown that the membranous appearance is due to the reagents employed, which cause the substance to contract. With sufficiently weak reagents, a mucilaginous mass is obtained; but nothing that can be compared to a membrane. See Pringsheim, Grundlinien einer Theorie der Pflanzenzelle, Berlin, 1854; in abstract in Mohl and Schlechtendal's Bot. Zeitung, 25th May 1855, and Annals, 2nd Ser. xv. p. 347.

the course of a few months this spore becomes developed into a *Vaucheria* *.

Pringsheim has also completed the observations of Thuret† and Decaisne on the reproduction of the Fucaceæ, studying particularly the common *Fucus vesiculosus*. In this it is not the spores, properly so called, that are fecundated, but these give origin in their interior to eight secondary spores (*Theilsporen*). During the ebb tide, at the moment when the plants are left dry upon the beach, these secondary spores issue from the mother-spore, and the antheridial sacs also quit the envelopes of the male organs. On the return of the tide, the antheridial sacs burst and give issue to the spermatozoids. These then press in crowds round the secondary spores, which are not yet enveloped by any membrane, and penetrate into their interior. After this fecundation, each secondary spore envelopes itself in a membrane and becomes developed into a Fucus. In this we have a case exactly analogous to that of the animal ovum, in which the spermatozoa penetrate into the vitellus before the formation of the vitelline membrane, or when it no longer exists (as in the Earthworms, according to Meissner).

In the Florideæ, it appears that there are two kinds of spores, of which some reproduce the plant asexually, whilst the others give rise to a product analogous to the prothallium of Ferns, or the pro-embryo of Mosses. It is upon the latter that fecundation takes place. In the Angiospermeæ of Kützing, Pringsheim

* A discovery exactly analogous to that of Pringsheim on the *Vaucheriæ* has lately been made by Cohn in a Conferva (*Sphæroplea annulina*, Ag.). In the cells of this plant stellate spores are produced, which, in their form, present a most deceptive resemblance to the reproductive bodies of the *Volvox stellatus*, Ehr. (hibernating spores of Stein). In the spring, the contents of these spores divide into two, and afterwards into four or eight parts, which become developed into zoospores. These zoospores move about for a certain time in the water, then fix in some place and give rise to young Confervæ. This is a first asexual generation. These young Confervæ, in fact, are only a kind of prothallium, for new spores, or rather new sporangia, are formed in their filaments; these present sexual differences. Some which present themselves in the form of a membrane, *pierced with a certain number of apertures*, have contents which become converted into spores; these are the archegonia. The others, the membrane of which is also *pierced with several apertures*, contain small, mobile, baculiform bodies; these are the antheridia, with their spermatozoids. The spermatozoids escape from their prison by passing through the apertures of the membrane, and, swimming through the water, go in search of the archegonia, into which they penetrate by passing the apertures of their membrane. Cohn has directly observed this interesting phænomenon. (Monatsbericht der Berl. Akad., May 1855.)

† [Thuret had previously seen and described minutely this process of fecundation: see Proc. Soc. Cherbourg, i. p. 161, and Ann. d. Sc. Nat. 4th Ser. ii. p. 197.—Ed. *Ann. Nat. Hist.*]

has also ascertained the existence of two modes of reproduction, one by zoospores and the other by fecundation;—at least the presence of spermatozoids and female organs leads to a supposition of the latter.

It is clear that fecundation must be a pretty general phænomenon in the Cryptogamia, and it is probably effected throughout by the entrance of the spermatozoids into the sporangia or archegonia. A plant allied to *Vaucheria*, the *Achlya prolifera*, in which Unger, Alex. Braun, Thuret and De Bary have studied the reproduction by zoospores, possesses spores of a second description, which are destitute of motion. These rather deserve the name of sporangia, like those of *Vaucheria*. Pringsheim has ascertained the existence of a micropyle in them, and has also pointed out the micropyle in the genera *Bulbochæte* and *Œdogonium*. Besides the zoospores and the stationary spores (sporangia), these two genera possess a third kind of spores, first indicated by A. Braun under the name of *microgonidia**, and which, according to his observations, germinate, and become converted into a small plant, usually composed of two cells. It is remarkable that these microgonidia, the structure of which is exactly analogous to that of the zoospores, fix themselves in *Œdogonium* sometimes on the membrane of the sporangia, and sometimes on the cell which is closest to them, and in *Bulbochæte* always upon the sporangia themselves. Pringsheim draws attention to the fact, that these microgonidia, when once fixed, open and pour their contents close to the micropyle in *Œdogonium*, and close to the cleft which takes its place in *Bulbochæte*. It is true that the existence of spermatozoids in the microgonidia has not yet been detected; but who can tell what the future has in reserve for us? It would be a great advance in the knowledge of the Cryptogamia, if it should be positively ascertained that the microgonidia are a kind of antheridia, for A. Braun has proved the existence of them in a great many families of freshwater Algæ; and it is probable, from the observations of Thuret upon several families of *Fucoideæ*, that they also occur in the marine Algæ. All that remains to be proved is the existence of antheridia in the *Palmellaceæ*, the *Spirogyræ*, the *Desmidiaceæ*, and the *Oscillarieæ*, in order to give us a complete and uniform picture of the development of the Algæ.

The mother-spores of the *Fuci* and the sporangia of the *Vaucheriæ* are, morphologically speaking, the homologues of the central cell of the archegonium in the Ferns and Mosses, to

* Beobachtungen über die Erscheinungen der Verjüngung in der Natur. Freyburg, 1849–1850. (Ray Society's Publications, 1853.)

which the canal with which this organ is furnished leads; they are also the homologues of the embryonal sac of the Phanerogamia. It appears that the central cell of the archegonium contains no trace of the embryonal cell before fecundation (Pringsheim), and that the latter is only formed subsequently, after the entrance of the spermatozoids, surrounding a portion of the contents of the central cell, and enclosing the spermatozoids.

Pringsheim puts the question, whether something of the same kind does not take place amongst the Phanerogamia, and whether the extremity of the pollen-tube, which penetrates into the embryonal sac, does not contain spermatozoids, which, in common with the contents of the sac, would surround themselves after this fecundation with a fine membrane, and thus give rise to the first cell of the embryo. Such an hypothesis* has no want of probability for those who admit Schleiden's theory, which, it must be confessed, has made some progress during the last few years. For my part, Henri Schacht has shown me some very delicate preparations which appeared to speak strongly in its favour, and which would have completely convinced any person who did not bear in mind the difficulty there is in such remarkably fine preparations in distinguishing what is interior from what is above or below. I have also examined Deecke's famous preparation (a longitudinal section of the ovule of *Pedicularis sylvatica*, with a pollen-tube which has penetrated into the embryonal sac†), which appears to me to be strongly in favour of Schleiden, notwithstanding all the objections which Mohl‡ has brought against it. In any case, the analogy with what takes place in the Cryptogamia and in animals comes in as evidence in favour of the defenders of Schleiden's theory; and although there is no doubt that in the inductive sciences we must be as careful as possible about reasoning from

* It is, moreover, perfectly possible that the presence of spermatozoids may not be absolutely necessary throughout; and it is not improbable that a liquid may play their part.

† See an article by H. Schacht, Flora, 1855, Nos. 10 and 11.

‡ Der vorgebliche entscheidende Sieg der Schleidenschen Befruchtungstheorie. Bot. Zeit. 11th June, 1855. These objections, however, are not of much value with respect to our present subject. Thus, Mohl first objects that the so-called pollen-tube might very probably be the suspensor of the embryo issuing through a rent in the sac, *although it appeared to Mohl himself to be a pollen-tube*. The argument is not one of the strongest. Mohl then passes to the second point; that is to say, he denies that the extremity of the pollen-tube forms the embryo, *without however pretending to dispute that this pollen-tube may penetrate into the embryonal sac*. But we ask nothing more to furnish the analogy with the Cryptogamia and animals, for in the latter also it is not proved that the embryo is directly produced from the spermatozoid or spermatozoids.

analogy, we cannot help regarding this as a reason for paying more attention to an opinion which is held by such distinguished observers as Schleiden, Schacht, Pringsheim, &c.*

We have thought it necessary to dwell briefly upon the fecundation of the vegetable ovule to complete what we had to say of the fecundation of the animal ovum; for it must be confessed, the relations are here so considerable, that they approach what we are accustomed to regard as serial identity in the study of organized beings. The distance which separates the modes of generation in different animals from one another, is often much greater than that which separates the mode of generation of a particular animal from that of a particular plant. Why then separate what Nature has united? Why wish to follow Schleiden when he refuses to recognize any relation between the physiological phænomena presented by plants and those of animals (without saying *why*, however!)? Every day the precise limits which have been arbitrarily drawn between the vegetable and animal kingdoms are disappearing from our view,—the physical and chemical characters have fallen one after the other†, and we have been compelled to fall back upon the presence of vibratile cilia and a contractile vesicle, which animals alone ought properly to possess. The first of these characters is already inadmissible, on account of the zoospores of a great many Algæ; and if we choose to consider the motive organs of these as bristles rather than as vibratile cilia, the *Closteria* will always remain as a stumbling-block. These, although generally regarded as plants, and having nothing animal about them, are, in fact, clothed with vibratile cilia on the whole of their internal surface. These cilia, first discovered by Föcke‡, but afterwards disputed by many, do really exist. If we take the contractility of the cell as the test, we must raise to the rank of animals the Monads, Cryptomonads, Chlamidomonads, and all the Monadina in general, as they have always one or two contractile vesicles. The botanists must also cease to regard the *Euglenæ* as plants,

* [Henfrey (Ann. Nat. Hist. 2nd Ser. xv. p. 349; Microscopic Dictionary, article Ovule; and in a paper recently laid before the Linnæan Society of London) holds that the fluid of the pollen-tube fecundates a protoplasmic corpuscle pre-existing in the embryo-sac, and determines the formation of a membranous coat converting this into the germ- or embryo-cell.—Ed. *Ann. Nat. Hist.*]

† The presence of amylaceous substances has entirely lost its importance since they have been found, not only in the Tunicata, but also in Man himself. Virchow (Wurzburger Verhandlungen, 1851; Annals, ser. 2, vol. xiii., p. 158), Prokitanski and Luschka (Virchow's Archiv, 1853), have demonstrated the presence of cellulose in the human brain (*corpora amylacea* of Purkinje), in the Malpighian follicles, in the spleen, in bones attacked by softening, &c.

‡ Physiologische Studien. Bremen, 1847.

as they possess one contractile vesicle (at least *Euglena viridis* does so)*. Many *Volvocinæ* also appear to possess contractile vesicles. It is moreover an idle dispute to attempt to decide whether these low organisms be animal or vegetable; for even if the question be decided, the two beings would still remain so closely related, that it would be a mere splitting of hairs to place one in one kingdom and the other in another. If there exists an actual division in Nature, it is that between the organic and inorganic kingdoms; and even there we must shut our eyes to certain Polycystina, and especially to some of those agglomerations of organized *raphides*, as it were, raised to the state of independent beings, to which the name of *Thalassicollæ* has been given. That my meaning may not be misunderstood—it is with the relation between animals and vegetables as with those of the group of Fishes with the neighbouring groups. In its broad features, the class of Fishes is one of the best existing in zoology; but if we descend into details, we shall find the limits, which at first appeared so well marked, become less and less distinct. If you ask a young student, he will very readily give you a definition of a fish, by means of its biconcave vertebræ, its heart with two cavities, its branchiæ, and some peculiarities of its brain. But if you question an ichthyologist, he will be much more embarrassed; for he knows, on the one hand, that there are fishes with lungs and a heart with three cavities (*Sirenoides*†); and, on the other, that there is a fish without vertebræ, without a brain, and without anything that can be called a heart (*Amphioxus*).

I hope I shall be pardoned for this digression, the only object of which was to show that it is not without reason that the vegetables and animals have been united in treating of the general phænomena of fecundation. We have ascertained the probable universality in the organized kingdom of the penetration of the spermatozoids into the ovules; but what is the part which they play when once arrived there? According to Meissner‡,

* To those who attach importance to chemical and physical characters I would observe, that, according to Angström's observations, whilst the green extract of the Phanerogamia gives three brilliant streaks in the spectrum, that of *Euglena viridis* only gives two, one in the green, the other in the red. It is remarkable that in this respect the *Euglena* behaves exactly like the three Confervæ in which Angström has studied the properties of chlorophyll (*Conferva glomerata*, a *Zygnema*, and a *Vaucheria*). Poggendorff's Annalen, xciii.

† It is to be observed, that the opinions of zoologists as to the true position of these animals (*Lepidosiren* and its allies) are by no means settled, so that M. Claparède is scarcely warranted in treating them as members of the class of Fishes.—Transl.

‡ Beobachtungen über das Eindringen der Samenelemente in den Dotter, No. i. Zeitschr. für wiss. Zoologie, vi., Sept. 1854.

at all events in the animals observed by him, they dissolve and unite to form a drop of oil, which must afterwards mingle with the substance of the vitellus. Nelson had previously seen them dissolve into a transparent fluid. But we may justly ask, whether this be really their destiny, or whether it be not rather the fate undergone by those which are not made use of, and which would consequently be condemned to the fatty metamorphosis, so common in animals, when Nature desires to facilitate the absorption of useless materials. The spermatists may perhaps some day raise their heads again, and again seek for their young embryo in the spermatozoid; the only object of which in seeking to lodge itself in the ovum would then be, to find a suitable medium for its development. In the Earthworms, in which, as we have seen, the eggs, on arriving in the common receptacle, float in a very considerable mass of semen, a large quantity of the latter passes with the eggs into the capsule at the moment of deposition. Those spermatozoids which have penetrated into the vitellus become converted there into an oily fat, which mingles with the elements of the vitellus; the others, according to Meissner, undergo the same metamorphosis, and remain in the form of fat around the vitellus. Subsequently, by means of their vibratile cilia, the embryos pass the whole of this fat into their alimentary canal, in the same way that the embryos of the Leeches consume their vitellus of nutrition.

It remains now to be seen whether the new discoveries have caused the theory of fecundation to take a step forward. The theory of the dynamists has not made any progress; for to say that the touching of an ovum by a spermatozoid awakens a new life in it, may be the expression of the fact, but is not an explanation. Bischoff, who not long since supposed that the essential part of the semen is the liquid itself, and that the spermatozoa only prevented its decomposition by their movements, has abandoned this opinion, and has the merit of having introduced into science a new theory, which appears capable of accounting for the facts, provisionally at any rate, in a more satisfactory manner*. It is well known that Liebig admits the existence in nature of a force analogous to the catalytic force of Berzelius, his *force of contact*, by means of which he explains various phænomena which, without it, would be difficult to understand. It consists in the fact that a body in a state of chemical decomposition, or, to speak more correctly, a body the molecules of which are in a state of chemical movement, is capable of disturbing the chemical equilibrium of certain other bodies, without adding anything to, or taking anything from

* Ueber die Befruchtungstheorie. Müller's Archiv, 1847.

them,—calling up in them, by virtue of its own state, a chemical movement which is in relation either to the composition of the bodies themselves, or to the quality of the chemical movement existing in the acting body. Thus, to take the commonest example, the ferment of beer, being in a state of chemical movement, induces the formation of alcohol in a saccharine solution, without, however, the occurrence of any chemical combination between the elements of the ferment and those of the sugar. This is an attractive hypothesis, and the more so as there is not perhaps a more general law in nature than that by which a body in motion communicates a part of its motion to another body with which it comes in contact; and this is more considerable in proportion to the amount of resistance offered by the second body. According to Bischoff, the seminal fluid may be compared to the yeast of beer, and the ovum to the saccharine solution. The former being in a state of chemical movement, would induce in the second a series of modifications, commencing with the segmentation of the vitellus up to the formation of the embryo. After all, this would only be to place the phænomenon of generation upon the same footing as that of digestion. In fact, whether we call the substances actively in operation in digestion, *ptyaline*, *pepsine*, *pancreatine*, or *diastase* of the saliva, of the stomach, pancreas, &c., we are not the less obliged to recur to the force of contact in order to account for their action. Bischoff's explanation was not very satisfactory, as long as it was believed that the semen only came in contact with the membranes of the ovum. But now that we know that the spermatozoa penetrate into the interior of the ovum, either through the micropyle or otherwise, and that when there they are in a state of chemical movement (the fatty metamorphosis of Meissner), this theory is far from losing probability. Nevertheless it is still nothing but a theory, convenient it is true, but impossible to demonstrate. That organized beings may be the products of a simple fermentation is possible, but we shall only attach positive credence to it when we obtain palpable proofs of its truth. The *force of contact*, again, is itself really nothing but the expression of the facts, and not an explanation; so that by Bischoff's theory the difficulty is only removed a step backwards. We must leave the question in doubt, impressed as we are with the feeling that great precaution is required in applying purely chemical explanations in such cases as the present, not merely to *organic*, but to *organized* bodies. The existence of the micropyle and the penetration of the spermatozoids into the ovules of organized beings are important discoveries; but by these only a corner of the veil has been raised, and the veiled image of Isis still leaves us many mysteries to be revealed. Thus we believe we must for once

sympathise with Keber, by repeating with him in conclusion the words of the great embryologist Von Baer :—

"The future still reserves rewards for more than one observer; but the palm will only belong to him who shall be fortunate enough in regard to the forces which preside in the formation of the animal body to determine their place amongst the general forces which govern the system of the world. The tree from which the cradle of this man will be made, has not yet germinated in the forest."

XXXVI.—*Another Note on* Scissurella.

By S. P. Woodward, F.G.S.

To the Editors of the Annals of Natural History.

Gentlemen,

When a naturalist thinks he has discovered an error in your pages, he is bound in courtesy to communicate his suspicions to the *author*—rather than the *editor*—that he may have an opportunity of putting himself right. I am compelled for once to depart from this practice, because I have protested in vain against the publication of the mistake.

The distribution of Mr. Jeffreys' Mediterranean shells was entrusted to Mr. R. Damon of Weymouth, who kindly sent me examples of *Scissurella elegans*. In these specimens I observed, and pointed out to Mr. Jeffreys, the conversion of the *fissure* into a *foramen* when the shell became adult; a circumstance which, like the operculum, had escaped his observation. I proposed, in accordance with modern practice, to give a *subgeneric* name to the species exhibiting this character; but on referring to Philippi, and Sowerby (Zool. Journ. 1824), I found it was already known, and existed in the species which Sowerby regarded as typical.

I was, therefore, rather astonished when Mr. Jeffreys told me, some time after, that he had written an article for the 'Annals,' adopting the notion I had discarded, and seeking to justify it by the testimony of persons unacquainted with the facts of the case. I urged him to refer to D'Orbigny's original paper in the Memoirs of the Natural History Society of Paris for 1823, but he declined taking the trouble, adding that I could do it.

In this Memoir the genus *Scissurella* was first described, and illustrated by large figures. The first and second species, *S. lævigata* and *costata*, were found living on sea-weed; the others, *S. decussata* and *elegans*, were obtained from the newest tertiary sands of Castel Arquato, in the Plaisantin. In the year 1844, M. Philippi figured two other *recent* species, *S. plicata*